

**Dover Municipal Landfill Superfund Site
Second Consent Decree for RD/RA**

Civil Action No. 1:92-cv-406-M

APPENDIX A-1

1991 ROD

(Part 4 of 6)

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that because the City of Dover and the Town of Madbury had been issued general notice of potential liability, that there would be a substantial increase in taxes. Many of these community members argued that an increase in taxes of the magnitude necessary to pay for the Preferred Alternative would drive businesses and residents away from the City of Dover and the Town of Madbury. Most citizens, officials, and PRPs who commented on the EPA's Proposed Plan said that a less costly solution - such as monitoring and institutional controls - would be sufficient to protect human health from the threats posed by the site.

Other members of the public supported EPA's Proposed Plan, including the Water Department of the City of Portsmouth, which draws drinking water from the Bellamy Reservoir.

III. SUMMARY OF PUBLIC COMMENTS AND AGENCY RESPONSES

This Responsiveness Summary addresses comments received by EPA during the public comment period (March 26 to May 24, 1991). Twenty-one individuals (including representatives from the cities of Dover and Portsmouth and Town of Madbury, members of the Dover PRP Steering Committee, and area residents) addressed EPA's Preferred Alternative during the public hearing. Eight sets of written comments were received by EPA during the public comment period (including comments from area residents, the Dover City Manager, a Dover City Councilman, the Mayor of the City of Dover, the City of Portsmouth Public Works Department, the Town of Madbury, and the Dover PRP Group). A citizen's petition was also received.

Part I - Citizens, and Local Officials Comments

Comment 1: The majority of the comments received addressed the inability of the City of Dover to pay its share of the proposed \$26 million cleanup cost. Twenty-two individuals commented that the Preferred Alternative would be too costly. Each comment emphasized the fact that local residents and industries are already experiencing economic difficulties and that the cost of EPA's Preferred Alternative is more than the City's taxpayers could possibly afford. The following specific issues related to the cost of remediation were raised by various individuals:

- The City of Dover has been allocated over 60 percent of the clean-up costs by the PRP Steering Committee and it's \$16 million share of the cost

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for the implementation of the Preferred Alternative exceeds the City's \$13 million borrowing limit (City Manager, State Treasurer).

- The total cost in capital for the Preferred Alternative would be \$3000 per Dover household (City Manager).
- Other financial demands on taxpayers currently include the cost for the water and wastewater treatment plant, education, fire and police protection, solid waste disposal, street repair, and public health services.
- Cities/towns are being forced to seek less costly means to achieve goals in a bad economy; it was requested that EPA do the same (Dover School Department Representative).
- Businesses do not have enough money to spend on cleanup. EPA should consider the fiscal impact on the community as well as the environmental impact. The cost of cleanup will have a devastating effect on the ability to compete and gain industries in Dover (Chamber of Commerce, Economic Commission, and Dover Industrial Development Authority representatives).
- Area taxpayers and businesses will also be affected by the costs to remediate the nearby Coakley and Somersworth Landfills. The total amount of money to clean up all sites was estimated at \$70 million (Town of Madbury's Attorney).
- The harm to be caused by the taxes necessary to fund the Preferred Alternative outweighs the harm potentially caused by the effects of the contaminated drinking water (one resident and former City Council member).

EPA Response: In selecting the remedy for the Dover Site, several aspects of the costs associated with this remedy were evaluated in detail including, among others, the cost-effectiveness of the remedy when compared with other alternatives and the total short and long term costs of each alternative, including the remedy, compared with the level of protection offered by each alternative. As a result of

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these evaluations EPA has determined that the selected remedy is cost-effective and that it complies with all statutory and regulatory mandates which address cost-effectiveness.

It should be noted that while the cost of each remedial alternative evaluated by EPA was an important factor in determining a remedy for this Site, cost is neither the only nor the most important criterion in EPA's analysis. In accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the National Contingency Plan (NCP) and related EPA Guidance, cost was one of a number of factors used to evaluate potential remedial actions at several stages in the remedy selection process. First, a large number of technology process options which could be implemented at the Site were evaluated for their effectiveness, implementability, and cost. Secondly, a range of alternatives which combined the various technology process options to address all media and contaminants of concern were evaluated on the same three criteria, including estimated cost. Thirdly, a detailed analysis of several select alternatives was undertaken; this analysis was performed using the nine criteria set out in the NCP, one of which is cost. (These nine criteria appear in Section IX of the ROD Decision Summary and at 40 CFR 300.430(e)(9)(iii).) Lastly, the selected remedy - which in this case combined portions of several source control and management of migration alternatives and which cut more than \$1.6 million from the proposed remedy - was evaluated on the same nine criteria, including cost.

As to the weight accorded cost-effectiveness in this multi-staged evaluation, the NCP and related EPA Guidance define cost as one of five primary balancing criteria to be considered only after the first two threshold criteria have been satisfied. Those threshold criteria include overall protection of the human health and the environment and compliance with all federal and state laws which are applicable or relevant and appropriate (ARARs) to this Site. In essence, any alternative which does not meet these threshold criteria cannot be selected as the remedy.

In this case the threshold requirement that the remedy meet all ARARs is particularly significant because ARARs establish the basic design criteria for major portions of the remedy, such as the multi-layer cap. For example, the multi-layer cap accounts for approximately 70 percent of the total costs of the remedy. Thus the threshold costs - those

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that cannot be avoided if the EPA is to comply with its statutory and regulatory mandate - account for a very large portion of the total costs.

While the cost-effectiveness of the remedy has been thoroughly analyzed in the remedy selection process as set out above, neither the Superfund statute nor applicable regulations allow the economic climate of southern New Hampshire or the financial well-being of those who will ultimately bear the burden of the remedial costs to be a factor in the selection process. CERCLA's statutory mandate as well as the strictures of the NCP require that cleanup standards be established through an analysis of the risk to human health and the environment and the applicable or relevant and appropriate environmental laws. Cleanup levels are set without regard for who will be named as a Potentially Responsible Party and who will ultimately bear the costs of remedial action. EPA cannot establish different cleanup levels, comply with fewer ARARs or select a less protective remedy at a site as a result of who will be liable for the cleanup costs.

In this instance, the City of Dover and the Town of Madbury were issued general notice of potential liability because, on EPA's analysis they qualify under CERCLA Section 107 as generator, transporter, and/or owners/operators with respect to the Site. EPA has issued 37 notices of potential liability to Potentially Responsible Parties (PRPs). These PRPs include local industries, municipalities and individuals. The liability for the total costs for the implementation of the selected remedy is joint and several - that is, all parties are liable for the total costs of the remedy.

As liability for the cleanup is joint and several, the share of the costs to be borne by the taxpayers of Dover and Madbury will depend on any agreement these towns reach with the other PRPs at the Site. The City of Dover has been an active participant in the PRP Steering Committee which calculated the internal PRP allocation of costs to date.

Comment 2: Six individuals questioned why the Preferred Alternative was selected if the groundwater contaminant plume already appears to be receding and conditions appear to be improving as a result of the installation of the cover material and drainage trench when the Landfill was closed. Specific related issues raised include the following, listed as comments a through d.

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EPA Response: Based on the extensive scientific study of the Site, EPA has concluded that the contaminant plume is not receding and that the original cover material and firebreak trench have been, and continue to be, ineffective at protecting the human health and the environment. Site studies have shown that total VOC concentrations in some wells have decreased, however these same studies have indicated that in other wells, total volatile organic compounds (VOC) concentrations have increased. Chemical concentration fluctuations are typically observed in contaminated groundwaters at hazardous waste sites. Figure 5-2 of the FES compares the HMM ND (non-detect) plume (FES) and the GZA ND Plume (RI). It is apparent from those interpretations that the lateral extent of the plume has not significantly changed from the Remedial Investigation to the Field Element Study. While contaminant concentration data for certain compounds in off-site wells, such as trichloroethylene and 1,2-Dichloroethane indicate a decrease in concentrations, other compounds such as vinyl chloride and methylene chloride indicate an increase in concentrations. Further, vinyl chloride, which was only found at trace levels in the RI, was detected in three wells during the FES at up to 31 times the Safe Drinking Water Act Maximum Contaminant Level (SDWA MCL).

As to the effectiveness of the closure activities in the early 1980s, the cover material placed on the Landfill consisted of sandy loam which provided only limited protection from dermal contact with contaminants and little or no hydraulic barrier which would prevent precipitation from infiltrating through the Landfill as this material is porous in nature. At present, much of this cover has eroded away, exposing some Landfill wastes. Only sparse vegetative growth covers the majority of the Landfill. Therefore, the cover currently does not preclude rainwater from infiltrating the Landfill resulting in the migration of contaminants into the groundwater, south and east of the Landfill.

In addition, the Landfill was constructed using standard fill and cover techniques, without any definitive drainage system or leachate collection systems. As a fire preventive measure, the Landfill was surrounded by a "firebreak" trench. The drainage trench was constructed by re-excavating to a shallow depth and berming the excavated materials to one side. The trench currently intersects the groundwater table during seasonal high groundwater level conditions and collects and conducts contaminated Landfill

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leachate and surface water runoff to the Cocheco River. At certain times of the year, the drainage ditch is dry; it is believed that during that time, contaminated groundwater flows under the trench and migrates into the groundwater around the Landfill.

That the landfill was closed in the early 1980s in accordance with state standards, as asserted by one commenter, is not dispositive of the selection of a remedy at this site. CERCLA charges EPA with cleaning up Superfund sites so that they address the current and future threat to human health and the environment and meet all applicable or relevant and appropriate environmental laws. There is no 'grandfathering' of past ineffective remedial measures. In addition, EPA takes no position with respect to whether these past remedial measures were consistent with applicable state laws.

Comment a: The Mayor and the Attorney for the City of Dover expressed concern that the disturbance of the existing Landfill cover would probably do more damage to the environment and cause greater risk to human health than would occur if it were left untouched.

EPA Response: While it is possible that there may be some short-term, adverse impacts to the environment as a result of the recontouring of the Landfill, in the long-term the proper closure of this Landfill will provide far greater protection to human and health and the environment than the current Landfill cover and drainage trench.

The recontouring activities include consolidation of the existing Landfill perimeter soils and debris from the toe of the Landfill side slopes, as well as the drainage ditch sediments, on top of the Landfill prior to capping. The recontouring of the Landfill is to provide adequate slopes to allow proper drainage and to minimize the amount of imported clean fill required to achieve the necessary slopes (a significant reduction in cost is obtained by limiting the amount of clean fill necessary).

Before recontouring can begin, a preliminary assessment will be performed consisting of surface geophysics and test pit explorations to ensure that excavation is limited to areas containing predominately soils, debris and municipal waste. However, it is possible even with these precautionary measures that the excavation in the Landfill could expose some hazardous substances in various forms such as barrels,

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sludges, etc., and some releases could occur. Therefore, EPA will require that extreme care be exercised during excavation in the Landfill and that contingency measures such as dust and odor suppressant foam be developed and implemented as necessary. Any hot spots or full drums encountered will be tested and removed, treated and disposed of in an off-site RCRA TSD facility.

In addition, continuous air monitoring will be conducted to detect unacceptable exposure levels to workers and area residents from inhalation of fugitive dust, organic vapors, and emissions generated during Site work.

Comment b: Two Dover City Council members questioned the appropriateness of using data collected seven years ago as the basis for the choice of the Preferred Alternative. These council members believed that contaminant levels have decreased. They suggested that actions be taken only if the public health is definitely threatened.

EPA Response: The statement that the remedy is being selected on data which is seven years old is inaccurate. Data collection at this Site commenced in the early 1980s and has continued up until this year. The last round of sampling - performed by NHDES - occurred in the spring of 1991, shortly before the issuance of the Proposed Plan. All of this data has been analyzed to determine whether remedial action is necessary and whether the remedy will be protective of human health and the environment.

Remedial action is taken at a Superfund site on the basis of unacceptable risk as well as the failure of the site to comply with all ARARs. The risk calculation in this case is based on that data collected in 1989 and 1990 by HMM in the Field Elements Study, as well as some portions of the data collected by Wehran Engineers in 1985 and 1986. Some of this data was confirmed as recently as several months ago. As discussed in the ROD and supported in the Administrative Record, all of this data indicated that there remain unacceptable risks to human health from this Site.

All of the data collected, including that collected in 1991, indicates that, among other things, off-site groundwater contains levels of contaminants above limits set by the Safe Drinking Water Act MCLs which are an ARAR for this Site. This exceedence of ARARs, confirmed by data taken just a few months ago, is another reason for the selected remedial action.

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The comment that contaminant levels have decreased has been addressed in more detail in a EPA's response to comment number 2. In essence, while total VOC concentrations in certain well locations and some individual contaminant concentrations have decreased others have increased. The extent of the plume configuration does not appear to be receding. In addition, there is no indication that the risks associated with the Site has lessened.

Comment d: One resident did not understand the need for remediation since no one has seen any dead animals or birds and since there are plenty of shrubs and trees growing around the Site. He believes that the land will refurbish itself.

EPA Response: The lack of dead animals and the presence of trees and shrubs does not indicate the lack of contamination at the Site. The Site presents both current and future risks to humans, flora and fauna through contaminated groundwater, surface water, soils and sediments. Groundwater contamination, although not visible to the human eye, is a substantial threat at the Site. The contaminated groundwater and the threat it presents will continue if the source of this contamination is not controlled.

Additionally, contaminated sediments in the drainage swale present a threat to aquatic inhabitants of the Cocheco River and to a lesser extent, a threat to humans. The same is true of the perimeter drainage ditch which is a visible source of surface water contamination. Many wild animals, such as deer and raccoon, drink from this water, and are therefore exposed to the contaminants present in the water. Frogs in this drainage ditch are exposed to the contaminants in the sediments and surface water. Humans may also be exposed to these contaminant pathways.

As to the comment that this Site will 'refurbish' itself without remedial action, all sampling and modelling indicate that it would take decades for natural processes to make this Site safe and to return the natural resources of this area to their beneficial uses. As set out in the Feasibility Study, taking no action at this Site is to allow the contaminants to remain and spread for generations.

Comment 3: Representatives of the City of Dover and Town of Madbury, and other concerned citizens and officials recommend that a less costly alternative be considered. Specifically, these individuals recommended that EPA

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consider the following actions before finalization of the Preferred Alternative:

- implementation of a limited action proposal such as Alternative SC-2;
- damming and mounding of water in the Bellamy Reservoir to reverse further flow toward the reservoir and creating the equivalent of a hydraulic control in that area;
- defer implementation of the Management of Migration alternative; and
- delete any requirements to install an upgradient interceptor trench, or at least separate its flow from the downgradient trench.

These individuals note that the above options would be less costly. They also believe that since institutional controls have been implemented, a public water supply has been provided and the contaminant plume appears to be receding, these options would be sufficient in protection of public health and the environment.

EPA Response: While EPA agrees that implementing a limited action remedy such as that proposed in these comments would be less costly in the short-term than implementing the selected remedy, a similar limited action plan was reviewed in detail in the remedy selection process and rejected. The analysis of such a limited action can be found in the Feasibility Study and summaries of the analysis can be found in the Proposed Plan and in the ROD Decision Summary. In essence, such a plan would be inconsistent with the intent of CERCLA and with the NCP insofar as it fails to comply with ARARs, it fails to provide adequate protection to human health and the environment, it fails to provide a long-term solution, and it fails to reduce toxicity, mobility or volume through treatment. In particular, the heavy reliance on institutional controls for a long-term solution is inconsistent with the NCP where active remedial measures are practical. In addition, the failure to return the off-site groundwaters to their beneficial uses in a reasonable time is also inconsistent with the NCP.

EPA does not agree that raising the water level of the Bellamy Reservoir will reverse further flow toward the reservoir, although it may decrease the hydraulic gradient

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between the Landfill and the reservoir thereby reducing the groundwater velocity. This action does nothing to ameliorate the problem of the continued movement of contamination from the Landfill.

In addition, such an action, implemented without addressing the source of contamination, suffers from many of the same problems as long-term reliance on institutional controls that are listed above. In particular, it fails to prevent the formation of contaminated Landfill leachate and the future migration of the contaminants away from the Landfill. It also does not clean up the contaminated groundwater between the Landfill and the reservoir. In sum, such an action would be in contravention of CERCLA and inconsistent with the NCP in that it not only fails to satisfy the threshold criteria necessary for the selection of a remedial action but also meets few of the objectives for remediating this Site.

EPA has analyzed in detail the deferral of the management of migration portion of this remedy. As set out in the ROD, an active management of migration remedy has been chosen for the southern plume so as to clean-up the groundwater in a shorter time frame than that for natural attenuation and to manage the plume so it does not reach the Class A waters of the Bellamy Reservoir. In addition, deferring the management of migration portion of this remedy so that it may be re-evaluated after the cap has been placed, allows groundwater risks to remain for an extended period and fails to institute any short term protection for the Bellamy reservoir.

EPA agrees that there should be a separation of flows between the upgradient diversion portion of the trench and the downgradient interceptor trench. This was not made clear in the Proposed Plan. The function of the upgradient trench, included in the selected remedy, is to divert clean groundwater from any contact with the waste materials, thereby reducing the volume of contaminated groundwater requiring treatment. The clean groundwater will be diverted to the Cocheco River or as necessary, recharged back to the wetlands to prevent dewatering of the surrounding wetlands.

Comment 4: A resident suggested that grading the Landfill, diverting surface water away from the Landfill, and vegetating the Landfill surface should be sufficient in controlling and naturally abating the contamination.

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EPA Response: The selected remedy as described in the ROD includes grading the Landfill, directing surface water away from the Landfill and establishing vegetation on the Landfill surface. As noted in the responses above and in the extensive analysis of this Site contained in the Administrative Record, these actions alone are not sufficient for the protection of human health and the environment and do not meet the ARARs for the Site. In essence, this proposal is little different than the no-action remedy evaluated in the Feasibility Study and rejected in the remedy selection process; it fails to meet not only the threshold criteria (protectiveness and satisfying ARARs) but also fails to provide long-term protection and to employ treatment as part of the solution to the contaminant threat.

Comment 5: A Dover resident questioned why the Dover Landfill was singled out for cleanup when thousands of other Sites are more contaminated.

EPA Response: The basis for this Site's proposal and then placement on the National Priorities List (NPL) can be found in the Hazardous Ranking Package and those studies on which these documents are based; all of these materials are contained in the Administrative Record. In essence, this Site was placed on the NPL after the discovery that contaminants from the Landfill had polluted residential wells adjacent to the Site, that contaminants were flowing from the Site directly into the Cocheco River and that two municipal drinking water sources, the Calderwood Well and the Bellamy Reservoir, were in close proximity to the Site.

The Dover Municipal Landfill was proposed for the NPL on December 30, 1982, was ranked and listed on the NPL on September 8, 1983. The activities leading to its placement on the NPL include studies of the Landfill and its impact on the surrounding area performed by the NHDES and the Cities of Dover and Portsmouth. These studies were conducted as a result of the concern that Landfill contaminants were in close proximity to the Calderwood Well and the Bellamy Reservoir. These studies indicated that although the Bellamy Reservoir and the Calderwood Well had not yet been contaminated by the Landfill, residential wells and the Cocheco River were being polluted. Residential wells near the Landfill were found to be contaminated with VOCs in 1981. The Cocheco River was being contaminated by leachate, generated by the Landfill, and discharging via a local stream (swale) to the river.

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In 1982, the City of Dover informed the EPA of its concerns about the Site. EPA performed a preliminary assessment and site investigation of the Site, which then led to the development of a Hazardous Ranking Package and the ultimate proposal for and placement of the Site on the NPL.

For a comparison with other sites considered for the NPL, the public should consult EPA's Superfund Inventory called CERCLIS, which contains the preliminary assessments and site investigation reports of other "sites," which after evaluation, either did not require the generation of a Hazardous Ranking Package, or if a Hazardous Ranking Package was required, the "scoring" for that particular site did not meet the criteria for proposal on the NPL.

Comment 7: A City of Dover Councilman felt that during the public meeting EPA downplayed the danger to public health and safety posed by the Site. He questioned why remediation is necessary if the risks are not great.

EPA Response: EPA disagrees that the risks to public health and the environment have been "downplayed" by EPA. The immediate threat to public health from the Dover Municipal Landfill Site was removed from the Site when residents were supplied with a public water line in 1982. The baseline risk assessment (performed initially during the RI and supplemented in the FES) estimated current and potential exposures and risks to public health from several exposure pathways, using current data and assuming no remediation will take place in the future (no-action). EPA has identified the estimated risks for the Site, from the various exposure pathways, and these risks indicate that the primary threat of exposure is from future use (i.e., drinking) the contaminated groundwater around the Site. The risk assessment do not set clean-up levels for remediation, but is intended to be used as a basis for the evaluation of various alternatives proposed for the cleanup of the Site.

Comment 8: A City of Dover Councilman stated that a clay barrier many feet thick prevents water from reaching the bedrock from where the city wells draw their water. He concluded that this factor along with the fact the Bellamy Reservoir has not been affected calls for modifications to the Preferred Alternative.

EPA Response: EPA assumes that the "bedrock from where the City wells draw their water" is referring to the lower hydrogeologic unit comprised of sandy gravels and dense

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till, rather than the actual bedrock unit. EPA agrees that the marine clay unit, which underlies the Site and separates the upper and lower hydrogeologic units, inhibits the contaminated groundwaters in the upper hydrogeologic unit from reaching the groundwaters in the lower hydrogeologic unit. Data has also indicated, to date, that the Bellamy Reservoir has not yet been contaminated by the groundwater migrating from the Landfill. Each of these factors has been taken into consideration in the selection of the remedy for this Site.

However, as discussed in detail in the Feasibility Study and in the ROD, these factors do not change the fact that the groundwater in the upper aquifer has contaminant levels exceeding those considered safe for drinking and thus the Site ARARs are not met. In addition, in accordance with the NCP and related EPA Guidance the remedy at this Site is based in part on the future risk related to the groundwater contamination in the upper aquifer. Again the facts cited in this comment do not address this risk.

In essence, this comment takes the position that if there is no threat to the current municipal drinking water sources, then the remedy should be less protective. The NCP and related EPA Guidance take the contrary view; all risks related to a Site, including risks associated with future private consumption of contaminated groundwater, must be addressed in the remedial action. A remedy which does not address the contaminants in the upper aquifer fails to satisfy even the threshold criteria required by the NCP.

Comment 9: The City of Portsmouth Public Works Department submitted a comment in support of EPA's Preferred Alternative because the "cleanup plan is taking the necessary steps to correct the problem and protect the Bellamy Reservoir". It was stated that since over thirty-thousand residents are served by the Bellamy Reservoir, this water supply should be protected. The City of Portsmouth also noted that the "reservoir would be difficult, if not impossible, to replace at a cost much higher than it would be to clean up the landfill that threatens it".

EPA Response: Each element of the selected remedy will be consistent with protecting the Class A waters of the Bellamy Reservoir. The remedy requires active groundwater treatment in the southern plume as well as the management of the plume so that it does not reach the reservoir. This active treatment of the southern plume will only be foregone if new

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evidence reveals that the plume poses no threat to the Bellamy Reservoir.

Comment 10: Two area residents commented that they hope EPA will not relax necessary requirements based solely on the cost or financial impact to the PRPs. These residents are concerned about what effect no action or limited actions will have on their property value. They do not feel that placing a fence and warning signs around the Landfill protects either the public or the environment from possible hazards. Hunters, bikers, and four-wheel vehicles still use the Site and deer feed and drink from the land around the Landfill. These residents do not believe that they should be penalized for the PRPs unwillingness or inability to correct mistakes made in the past.

EPA Response: The selected remedy employs a combination of waste containment, capture and treatment, and natural attenuation that satisfies all statutory and regulatory requirements. The remedy is also consistent with this comment, in that it takes active measures to protect human health and the environment; neither no-action nor limited action were chosen for this Site.

Comment 11: A petition signed by Dover and Madbury citizens urges EPA to adopt a "reasonable and economically feasible" plan for the cleanup of the Dover Landfill. The petition recommends continued monitoring and installation of a new cap only if conditions worsen. It is also recommended that additional actions should be placed in only as necessary to correct worsening conditions.

EPA Response: The cost-effectiveness of the remedy is addressed in the response to Comment 1 as well as in the ROD. The limited action proposed - monitoring and staged implementation of remedial actions only if Site conditions worsen - is inconsistent with the NCP in that it fails to satisfy not only the threshold requirements for remedial action but does not meet the site-specific remedial objectives set out in the Feasibility Study and summarized in the ROD. In addition, the response to Comment 3 is equally relevant to this comment.

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Part II Summary of Potentially Responsible Party Comments

Balsam Environmental Consultants, Inc. (Balsam) submitted written comments on behalf of the Dover Landfill PRP Group.

Balsam commented that certain elements of the Proposed Plan are overly protective of human health or are "environmentally or technically impracticable." The Balsam comments are summarized below.

Comment 1: Balsam recommends that EPA select a "sequential and phased" remedy for the Site instead of implementing all of the components of the Proposed Plan simultaneously. Balsam proposes the following four sequential phases.

Phase I: Construction of a properly designed cap over the Landfill, installation of a ground water and surface water monitoring system, and implementation of access and institutional controls.

Phase II: Construction of an interceptor trench upgradient of the Landfill with discharge of collected clean ground water to the Cocheco River through an NPDES-permitted outfall.

Phase III: Installation of an interceptor trench downgradient of the Landfill, with treatment of collected ground water.

Phase IV: Installation and operation of an offsite ground water extraction and treatment system.

Balsam proposes that if results of ground water monitoring reveal that Site cleanup objectives have not been achieved after the completion of each phase, additional phases would be implemented sequentially.—Balsam contends that such an approach would be consistent with the National Contingency Plan 40 CFR 430(a)(ii)(A) and satisfies the nine criteria for evaluation outlined in 40 CFR 300.430(e)(a)(iii). Furthermore, Balsam contends that a phased remedial program is appropriate for the Dover Landfill Site because "significant" risks to human health and the environment are not currently posed by the Site and future risks are not "significant" because of institutional controls; therefore, Balsam takes the position that the additional time that may be associated with completion of its proposed remedial

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program should not result in increased adverse impact to human health.

Balsam also states that it would be premature to implement onsite hydraulic controls and active ground water remediation without a more complete understanding of the current hydrogeologic conditions at the Site. Balsam recommends that implementation of the hydraulic control and management of migration elements of the Preferred Alternative be deferred until better evaluation of the post-cover system installation ground water flow regime is developed, and associated changes in ground water flow and plume migration direction have been monitored in the field.

EPA Response: EPA has reviewed the Balsam proposal in detail and determined that it fails to meet not only the threshold criteria for the selection of remedial action, protection of the human health and the environment and compliance with ARARs, but fails to compare favorably with the selected remedy when evaluated against the five primary balancing criteria. The following response summarizes a number of important faults EPA has found with the Balsam proposal. In addition, one particularly important shortcoming of this proposal is addressed in detail.

In sum, the proposal fails to meet the threshold criteria for selecting a remedial action because: the proposal fails to satisfy many ARARs including groundwater clean-up levels established by Safe Drinking Water Act and the Resource Conservation and Recovery Act (RCRA), the federal and state hazardous waste laws requiring complete containment of hazardous wastes, and the federal and state laws protecting surface waters; the proposal fails to prevent the generation of contaminated leachate from the Landfill and the migration of this leachate into the surrounding groundwater and surface water, in contravention to ARARs and cleanup objectives; the proposal fails to provide sufficient protection to the Bellamy Reservoir in the short-term and long-term; the proposal does not provide for groundwater cleanup in a reasonable time frame; the proposal does not adequately address the long-term risks posed by the contaminant plumes; the proposal fails to address contaminated sediments in the drainage swale; and, by its nature, the proposal is not a permanent solution. In addition, reviewing this proposal in light of the five primary balancing criteria, among other problems with this proposal are the following: the proposal employs treatment as a last measure, contrary to the NCP's bias towards

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treatment of hazardous wastes; the phased approach may not be cost-effective if early remedial measures do not meet cleanup levels; a phased approach will generate substantially more administrative problems, and transaction costs will increase as well; risks may increase substantially if leachate is allowed to continue to migrate from the Site; the proposal conflicts with the NCP's mandate that institutional controls are to be used for long-term solution only where other means are not practical for cleaning up the contamination; and the phased approach may significantly delay the ultimate cleanup of this Site.

Of particular concern is the failure of the Balsam proposal to include a leachate collection and treatment system at the outset of the remedy. As described below, this proposal would allow continued contaminant migration from the Site, threatening human health and the environment and failing to meet many of the ARARs, in the hope that a limited remedial action will eventually meet cleanup objectives. Such a 'wait-and-see' approach to remedy implementation provides little assurance of either short term or long term protection from the Site.

At the Dover Site, substantial amounts of waste material currently lie beneath the water table and remain saturated during all or major portions of the year. The leachate from these saturated wastes coupled with the leachate produced by rainwater infiltrating through wastes above the groundwater table is the source of the contaminated groundwater downgradient of the Dover Landfill. While the cap alone will minimize or prohibit the amount of rainwater infiltrating through the waste, it will not abate the continued migration of contamination from the Landfill associated with normal groundwater flow.

The installation of an effective capping system is expected to somewhat alter the current hydraulic conditions within the Landfill and thereby influence local groundwater flow and direction characteristics; it will not decrease the amount of hazardous substances that are currently in the contaminant plumes and beneath the Landfill proper. Leachate that has been generated within the waste mass can also be expected to continue to move outward until such time as the waste mass is effectively de-watered (recharge being denied by installation of the cap). Portions of the waste mass may continue to remain beneath the water table unless the now relaxed groundwater mound falls permanently below the bottom of the wastes. Thus, the remedy's interceptor system will

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provide for collection of leachate until such time as the benefits of capping the landfill become fully effective or in the event that wastes remain beneath the water table collection will continue until leachate concentrations fall to and remain within acceptable limits.

Modeling conducted during the FS estimated cleanup levels will be attained within 5 to 7 years in the eastern plume and within 10 to 24 years in the southern plume provided source control measures are implemented including cap and the leachate/groundwater collection system around the Landfill. Without the leachate/groundwater collection system, contamination from within the Landfill or already in the aquifer will continue to migrate offsite thus increasing estimated times to attain cleanup levels in the eastern and southern plumes. Given these circumstances, ARARs would not be met in either plume at or beyond the compliance boundary within a reasonable time frame as required by the NCP and certainly not within the time frame which could be attained using active measures to control the migration of leachate/groundwater from the Landfill. A phased approach to instituting source control measures thus builds into the cleanup of the Site long periods during which contaminants may migrate off the Site and increase the threat to human health and further harm the environment.

Based on the above conclusions it is EPA's opinion that employing a "wait and see" method of remedy implementation does nothing to diminish, and could magnify, potential risks to human health and the environment.

EPA agrees that additional data must be gathered during pre-design and design to allow for the proper design and construction of the groundwater/leachate collection system. EPA also agrees that the groundwater/leachate flow patterns may change somewhat after the installation of the cap. However, EPA has not concluded that the resultant change will be significant. Further, EPA has concluded that the groundwater/leachate collection system can be appropriately designed in conjunction with the cap design. EPA acknowledges that, after implementation of both systems, some fine tuning of the collection system may be required to optimize its effectiveness. However, this is not considered unusual and can be provided for in the design.

Finally, the time to design and install the cap, to then wait until the groundwater flow regime under and around the landfill to stabilize, and to then design and construct the

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groundwater/leachate collection treatment system would take a substantial number of years, possibly in excess of ten. Only after this lengthy period would the groundwater remediation process begin. In the meantime contaminants would continue to migrate from the Landfill in the groundwater and surface water. EPA does not consider this approach to be consistent with the NCP in that the groundwater will not be returned to its beneficial use in a reasonable time frame, and the contaminated leachate entering the local surface waters would violate ARARs.

Comment 2: Balsam comments that the remediation of the southern plume through groundwater extraction and treatment does not appear justified. Balsam bases this opinion on the following factors: 1) EPA has concluded that the Bellamy Reservoir will not be significantly affected by contaminated ground water; 2) installation of an engineered cap over the Site will both significantly improve ground water quality and modify the existing hydrogeologic regime, both of which will serve to mitigate the southern plume; 3) ground water in the area will not be utilized due to institutional controls implemented by the City of Dover; and 4) closer examination of the risk assessment, which indicates that the majority of the potential future risk associated with the southern plume is attributed to arsenic, reveals that risks may be overestimated.

EPA Response: The possibility that the Class A waters of the Bellamy may be contaminated by the southern contaminant plume is one of several reasons for including the active treatment of this plume as part of the Proposed Plan and the overall remedy for this Site. EPA has determined that, to date, the plume has not had an adverse impact on the waters of the Bellamy; this does not mean that future contamination will not occur. As noted below, groundwater sampling and modelling has indicated that contaminants in the southern plume are moving towards the reservoir. In addition, natural attenuation will take from 10 to 24 years to improve groundwater quality to cleanup levels after the source control measures are put into place. Without active plume management these contaminants may reach the Bellamy during this lengthy period. More importantly, as discussed in the ROD, active plume extraction and treatment is justified even if the contaminants posed no threat to the Bellamy; the fact that groundwater contaminants exceed MCLs in an area that could be used for drinking water is sufficient justification for employing active treatment and management of this plume.

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As to the second basis for Balsam's opinion, EPA acknowledges that an effective cap over the Landfill may alter the ground water flow characteristics in the area of the southerly plume. However, there is little support for the position that a cap alone will cause a significant improvement in ground water quality in the downgradient plume. Even if an effective cap is installed on the Landfill, it is likely that groundwater will still flow in a southerly, downgradient direction. As indicated from Table 3-2 in the FES report entitled Elevation Information for HMM Installed Monitoring Wells, groundwater elevation in the upper unconfined aquifer ranges from one to five feet below surface grade. Therefore, it is assumed that some of the disposed waste deposited in the Landfill exists in the saturated zone. Accordingly, as indicated in a groundwater contour map of the Landfill area (Figure 3-6 in the FES), ground water could flow in a southerly, downgradient direction underneath the Landfill, through the existing industrial and municipal waste. This scenario would likely cause a continued migration and expansion of the VOC plume in a southern direction towards the Bellamy Reservoir. The cap will reduce the vertical flow of water through the waste but not the horizontal flow through the waste in the saturated zone.

In addition to allowing leachate to continue to flow beyond the Landfill boundaries, the cap would have little or no impact on the contaminants that have already migrated within at least 900 feet of the reservoir. While the flow may be somewhat retarded by a cap, those contaminants will continue to pollute the groundwater at and beyond the point of compliance and will continue to flow towards the reservoir.

It should also be noted that the calculation of the natural attenuation time frames for the eastern and southern plumes, by HMM, assumed that an active source control alternative had been installed and that further migration of contaminated groundwater and leachate had been eliminated. The natural attenuation time frames were estimated to be 5 to 7 years for the eastern plume and 10 to 24 years in the southern plume. These estimated time frames will increase if leachate and contaminated groundwaters are allowed to continue to migrate from the Landfill.

As noted in response to prior comments and in the ROD, institutional controls, if they are implemented, will provide protection from contaminated groundwater in the short-term. However, the NCP requires that such controls be

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used as a long-term measure only when other alternatives are not practical. In sum, the proposal that institutional controls be used for an indefinite period while Landfill leachate continues to contaminate groundwater is inconsistent with the NCP.

Balsam's position that the risk attributable to arsenic in the groundwater is overestimated is addressed in detail in EPA's responses to the Public Health Evaluation submitted by Environmental Standards, Inc. for the Dover PRP Steering Committee (comment c). In addition, the reasonable maximum risk for vinyl chloride, found at 31 times the drinking water standard in the southern plume, exceeds EPA's acceptable risk range.

Comment 3: Balsam states that EPA has not established criteria for the termination of the proposed groundwater recovery and treatment systems. Specifically, Balsam states that EPA does not discuss target cleanup levels (TCLs) or specific points of compliance that would be used to terminate recovery and treatment operations. Balsam recommends that these criteria should include attainment of TCLs in defined monitoring wells for a defined period of time. Balsam further recommends that, in determining TCLs, EPA should consider documented operational limitations of the ground water recovery and treatment system. Balsam notes that the use of Maximum Contaminant Level Goals (MCLGs) as a TCL is infeasible when the MCLG is zero, citing the preamble to the NCP.

EPA Response: EPA has set interim groundwater cleanup levels in the ROD which must be met before completion of the remedial action at and beyond the point of compliance. In accordance with the NCP, the point of compliance is established at the edge of the waste management area. When the interim cleanup levels have been attained in all monitoring wells at and beyond the point of compliance, a risk assessment will be performed on residual groundwater contamination to determine whether the remedial action is protective. Remedial actions shall continue until protective concentrations of residual contamination have been achieved or until the remedy is otherwise deemed protective. These protective residual levels shall constitute the final cleanup levels for the ROD and shall be considered the ultimate performance standards for the remedial action. The groundwater monitoring system will then be utilized to collect information for three years to ensure that the protective residual levels remain and the

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remedy is protective. The details of the groundwater monitoring program, such as number and location of monitoring wells and parameters, will be determined during remedial design.

EPA has also determined that until Site-specific data indicates that groundwater cleanup levels will not be met, it is inappropriate to include provisions which allow treatment to be terminated prior to the attainment of these levels. There is currently no Site-specific information that leads EPA to believe that the cleanup levels cannot be attained through extraction and treatment.

As noted in the ROD, interim cleanup levels for known and probable carcinogenic compounds (Class A and B) have been set at the appropriate MCL given that the MCLGs for these compounds are set at zero.

Comment 4: Balsam proposes that the compliance boundary for Site cleanup be established at the shore of the Bellamy Reservoir and at the banks of the Cocheco River. Balsam submits that the area bounded by the Landfill to the north, and the Bellamy and Cocheco to the south and east, would be established as a non-attainment zone. Balsam asserts that such a non-attainment zone is consistent with current New Hampshire groundwater policy which, it claims, is to be incorporated into New Hampshire's groundwater regulations at an undetermined point in the future. Balsam also commented that such a proposal is justified because institutional controls can be used to prevent the extraction of drinking water from this area, a City water supply can be provided in this area, and the source control measures will help eliminate the contaminant plume. A similar comment was also submitted by counsel for the City of Dover at the public hearing.

EPA Response: EPA has considered the above comment and determined that the establishment of a compliance boundary at the shores of the Bellamy and the banks of the Cocheco would be inconsistent with the NCP, insufficiently protective of the human health and the environment, and contrary to ARARs and the EPA's Groundwater Protection Strategy. In addition, a review of the current New Hampshire regulation which addresses this issue (Ws 410.13) but which is not an ARAR, indicates that even if it were an ARAR, the proposed compliance boundary would meet neither the letter nor the spirit of that regulation. Finally, the policy to which commenters refer is neither specified in

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their comment nor could be an ARAR as it is not an enforceable promulgated state regulation.

In accordance with the NCP, groundwater remediation levels will be attained at and beyond the edge of the waste management area. In this case the waste management area includes the Landfill and the perimeter drainage ditch. At the completion of construction of the source control portion of the remedy, the compliance boundary will be set at the outer edge of the interceptor trench; contaminants at and beyond that point must meet cleanup levels. While the NCP allows for site-specific exceptions to this general policy, at the current time no site-specific factors indicate that such an exception is appropriate.

In addition to being inconsistent with the NCP, the establishment of a zone of non-compliance beyond the edge of waste management area would be contrary with both federal and state ARARs controlling the protection of groundwater and surface water. Such a proposal, if accepted, would institutionalize the pollution of a potential drinking water resource and could allow the Class A waters of the Bellamy to be contaminated before any remedial action was taken. In addition, if groundwater remains contaminated in this area, an unacceptable risk to human health would also remain.

Finally, an examination of the current state regulation controlling compliance boundaries, from which the comment draws support but which is not an ARAR for this Site, indicates that the boundary should be set at the closer of: the property boundary, 500 feet from the waste material, or a distance set in a permit. In this case, a compliance boundary at the edge of the Bellamy Reservoir and Cocheco River would far exceed that set by this regulation because the property lines for this Site fall far short of those surface water bodies. In addition, it appears contrary to the letter and spirit of this state regulation for contamination to remain in groundwater beneath privately owned properties surrounding the Site.

As to the unspecified pending changes to New Hampshire regulations, in accordance with the NCP, ARARs are "frozen" at the time that the ROD is issued unless a later-identified ARAR is necessary to ensure that the remedy is protective of human health and the environment. The non-attainment area policy to which Balsam refers will not attain ARAR status by the time the ROD is issued, and, being less stringent than

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existing requirements, will not later be necessary to ensure protectiveness; it is therefore not an ARAR for this Site.

Related issues raised in Balsam's comment, such as the use of institutional controls, the nature of the groundwater flow, and the movement of the plume are addressed in other EPA responses.

Comment 5: Balsam states that EPA's preferred RCRA cap construction is overprotective. Balsam believes RCRA requirements are not applicable to the Dover Landfill Site cap because disposal activities ceased before the effective date of RCRA. Balsam recommends that EPA consider a five-layer capping system with a single hydraulic barrier, consistent with NHDES requirements: a soil cover layer, a sand buffer layer, a low permeability layer, a layer of free draining sand, and a layer of topsoil. Balsam notes that EPA has selected caps of similar design at other solid waste landfill Superfund sites in Region I.

EPA Response: EPA and the NHDES have reviewed Balsam's single barrier cap for use at this Site and rejected it. The single barrier cap fails to satisfy ARARs and does not provide adequate protection to human health and the environment. In addition it does not compare favorably with the selected remedy when evaluated on the five balancing criteria set out in the NCP and summarized in the ROD. EPA has determined that the selection of the multi-layer cap is consistent with the NCP and all relevant Guidance.

The NHDES cap, as proposed by Balsam for use at this Site and described above, was designed by the State of New Hampshire for closure of solid waste landfills in that state; the design requirements are the minimum engineering requirements for solid waste landfill caps. While this Site received large quantities of municipal solid waste during its operation, it also received substantial amounts of industrial wastes which would be considered hazardous (and regulated by RCRA) if disposed today. These wastes were not RCRA wastes at the time of disposal only because the regulatory and statutory requirements of RCRA were not in place at that time. These RCRA-type industrial wastes are now the source of contamination migrating from the Landfill into the surrounding groundwater.

Since significant quantities of RCRA-type wastes have been disposed in the Landfill and continue to pose a threat to human health and the environment, federal and state

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hazardous waste regulations have been deemed relevant and appropriate to the cleanup of this Site. The state solid waste laws are not ARARs for this Site. The cap will be designed to meet or exceed, among other standards, the performance requirements set forth in the state and federal ARARs including 40 CFR 264.111, 40 CFR 264.310 and the guidance document Final Covers on Hazardous Waste Landfills and Surface Impoundments, July 1989 (EPA/ 530-SW-89-047) (Technical Guidance). In addition, the use of a RCRA-type cap is consistent with EPA Guidance concerning the selection of remedies at municipal landfill sites; the Guidance manual Conducting Remedial Investigations/ Feasibility Studies for CERCLA Municipal Landfill Site, February 1991, EPA/540/P-91/000 (OSWER Directive 9355.3-11), recommends that a composite-barrier cap (multi-layer) is to be used when a landfill contains RCRA listed wastes, wastes sufficiently similar to RCRA listed waste, or RCRA characteristic waste.

In addition to compliance with ARARs, the multi-layer cap was selected for the Dover Landfill because infiltration is a primary concern due to the high annual precipitation in New Hampshire. The multi-layer cap provides an additional "barrier" layer, which reduces the rate of infiltration more than a single-barrier cap, such as the NHDES solid waste closure cap. The multi-layer cap is the best available cap, designed to provide maximum, long-term protection from infiltration due to precipitation.

Comment 6: Balsam submits that installation of a ground water interceptor trench around the entire perimeter of the Landfill, proposed by EPA, does not provide for segregation of upgradient ground water, which is presumed clean, from downgradient ground water. Balsam states that clean upgradient ground water would be conveyed for on-site treatment prior to discharge to the Cocheco River or the Dover POTW. Balsam believes that upgradient ground water ~~should be conveyed directly to the Cocheco River and discharged.~~ Balsam also states that the efficiency and effectiveness of the treatment process is greatly reduced when impacted ground water becomes diluted.

EPA Response: Although not clearly indicated in the FS, the upgradient portion of the "interceptor trench" will collect and divert clean groundwater around the Landfill. This point is clarified in the ROD.

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Comment 7: Balsam comments that the remediation of drainage swale sediments to address risk associated with arsenic present in the sediments is overprotective. Balsam states that the risks associated with direct contact and ingestion of swale sediments are within EPA's acceptable risk range. Balsam concludes that remediation of the drainage swale sediments does not appear to be warranted.

EPA Response: While EPA agrees that cleanup of the contaminated swale sediments is not necessary for the protection of human health because the risks associated with ingestion and dermal contact with these sediments falls within the accepted risk range, cleanup of the arsenic in the swale is necessary for the protection of the environment. EPA, in conjunction with NOAA, have determined that a cleanup level for arsenic in the sediments should be set at 50 ppm for the protection of aquatic biota.

Comment 8: One PRP commented that \$2 million have already been spent on trying to determine the best cleanup alternative for the Site and not one "shovel-full of dirt" has been removed. The PRP felt money was being spent "capriciously" and that less money should be spent on the Preferred Alternative.

EPA Response: The NCP and related EPA Guidance outline the process which EPA must follow in conducting Remedial Investigations and Feasibility Studies. While such a process may seem expensive and cumbersome, it is aimed at ensuring that the best remedy is chosen at each site while also creating national consistency in the proper selection of remedies for Superfund sites.

Following the issuance of the Record of Decision for the remediation of this Site, the design of the remedy will be undertaken. Once the design is completed, the construction of the remedy will commence. It is estimated that the design and construction will take approximately four years to complete.

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RISK ASSESSMENT

The Dover Landfill PRP Group submitted a report titled "An Updated Public Health Evaluation of the Dover, New Hampshire Municipal Landfill Superfund Site" dated May 18, 1991 and prepared by Environmental Standards, Inc. (ESI Report).

The EPA has evaluated this report as it did other public comments and considered it in selecting a remedy at this Site. Since the report was not submitted in comment format and did not specify particular areas of the HMM risk assessment with which it disagreed, it is particularly difficult for EPA to "respond" to the report. While this Responsiveness Summary does not provide a forum for EPA's detailed evaluation of the ESI Report, as noted below, efforts have been made to address major differences in the HMM risk assessment and the ESI assessment, and to highlight portions of the ESI Report with which EPA does not agree.

In sum, after a complete review of the ESI Report, EPA is not persuaded that, as ESI concludes, the Site poses no risk outside EPA's acceptable risk range. In EPA's view, the ESI Report does not comply with Regional risk assessment standards, at times employs collections of data which are not justifiable, considers factors which the Region determines to be inappropriate, and makes assumptions inconsistent with Regional policy.

General Comments & Responses:

Comment a: ESI provided risk analysis for three separate groundwater data sets:

- 1) RI data set, utilizing data from the most highly contaminated well (Well B-2U) as a basis of hypothetical long term exposure
- 2) the 95th percent upper confidence interval of the mean concentrations of the RI and FES data sets combined, and
- 3) the average concentrations of the most recent and validated data (FES data)

EPA Response: EPA determined it was not appropriate to use only the RI data set or the combined RI and FES data set because these data sets do not represent the most current

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chemical concentration levels (e.g, latest sampling results) found at the Site. EPA determined that the risk analyses for data sets 1 and 2 were not relevant because the estimated risks derived from those data sets would not reflect the risks associated with the current concentration levels found at the Site. EPA agrees that the use of data set 3, FES data, was appropriate to conduct the risk assessment. For the above reason, many of the responses which follow address ESI's risk assessment on data set 3.

EPA's risk assessment data set used average and maximum concentrations from the data collected during the Field Element Study by HMM Associates, except for two compounds: 1,2-dichloroethane which was not detected during the FES and tetrahydrofuran, which was not analyzed for during the FES. Data for these two compounds was taken from the RI. The supplemental risk assessment in the FES presented the average (most-probable) and maximum (worst-case) risks using the FES data except for the two compounds as noted above.

Comment b: ESI submitted this report to provide a summary of the methodologies and results of an independent risk assessment of the Dover Landfill utilizing the most current guidelines and data obtained during the RI and FES.

EPA Response: Region 1 policy, and the policy in effect when the risk assessment for the Dover Municipal Landfill was initiated was to calculate average and reasonable worst case risk estimates based on average and maximum observed concentrations. This approach was consistent with EPA Regional Policy and National EPA Policy at the time the risk assessment was initiated. Furthermore, it has remained consistent with current Regional Policy despite changes to the National Policy.

Reasonable Maximum Exposure

Recent EPA national risk guidance (RAGS) recommends calculating one risk estimate using the 95% upper confidence limit on the mean concentration corresponding to a reasonable maximum exposure estimate. The authors of this guidance have not yet provided sufficient information to employ that portion of the guidance related to the 95% upper confidence limit in a nationally consistent manner. Furthermore, the recent national guidance is simply that - guidance. Current Region I risk assessment policy is consistent with the NCP which requires the evaluation of the Reasonable Maximum Exposure. Region I, therefore, has

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chosen to follow its consistent policy of using average and reasonable worst case risk assessments until such time as a nationally consistent methodology is developed.

Furthermore, in the case of the Dover Risk Assessment, not only were EPA's average and reasonable worst case risk estimates in excess of EPA's acceptable risk range, but a 95% upper confidence level of the mean concentration as computed by ESI (following the recent National EPA Policy) also appears to exceed the acceptable risk range. The average and maximum cumulative risks, from the HMM FES Supplemental Risk Assessment (and thus EPA's risk assessment), are 1.86×10^{-2} and 6.97×10^{-2} , respectively.

Exposure Parameters

EPA's risk assessment prepared by HMM was submitted on February 11, 1991 and presented both average and maximum risks. Exposure parameters used in this assessment were consistent with Region I policy and National Superfund Policy, applicable at that time, and the Office of Drinking Water which uses a 70 year exposure period to derive MCLs. Some of EPA's parameters differ from those used by ESI. For example, EPA assumed a 70-year vs. 30-year exposure duration for groundwater ingestion, and assumed that 100% vs. 75% of groundwater ingestion occurs at home. Furthermore, the use of ESI parameters would not have resulted in significant decreases in EPA's risk estimates.

Exposure Pathways

ESI has also included two exposure pathways in the quantitative risk assessment which EPA did not: inhalation and dermal absorption during household use of groundwater. Currently Region I only evaluates these pathways qualitatively because there is no consensus either in Region or in Headquarters on how to quantitate the risks from these exposure pathways. If EPA had evaluated these pathways quantitatively, the total risks would have been even greater (by perhaps a factor of 2).

ESI's Missing Compound

EPA Regional policy as well as the national guidance state that risks for all classes of carcinogens should be added. ESI omitted the one class C compound from the cumulative risk, 1,1-dichloroethylene. EPA calculated a risk range of 2.2×10^{-5} to 2.2×10^{-4} for this compound which factored into EPA's cumulative risk estimate.

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Specific Comments & Responses:

Comment c: ESI States that elevated arsenic levels were found in groundwater samples at the Site, in wells which are clearly upgradient of possible Site influence, and in other wells where no VOCs or other markers of landfill impacts were evident. ESI also states that New Hampshire is known to have high concentrations of arsenic in pristine groundwaters. ESI states "According to EPA's guidelines, it may be appropriate to eliminate this element from the risk assessment." In addition, ESI states that very few samples were filtered and that by limiting water analysis to unfiltered arsenic, "this aspect of the investigation was rendered meaningless". ESI states that arsenic data does not appear to correlate with the levels of contamination by VOCs, therefore no conclusion can be drawn with respect to landfill influence on arsenic in the shallow aquifer at this Site.

EPA Response: EPA agrees that there may be elevated levels of arsenic in the groundwater around the Site. EPA does not agree that arsenic should be eliminated from the baseline risk assessment when background levels of arsenic in the groundwater has not been readily identified at this Site. Given the high concentrations of arsenic found at the Site, EPA does not anticipate that once the background level is determined, that it will significantly alter EPA's risk assessment. EPA's approach to evaluating risks at a site, is that all risks for the Site, whether background, site related, or both be included in the baseline risk assessment.

Data indicate that for VOCs, the four most contaminated, shallow aquifer wells during the RI: OW-1A, B-4U, OW-5U, and B-2U respectively, are also the four most contaminated wells for arsenic according to FES data. EPA notes that although well OW-1A was not sampled for arsenic during the FES, MW-101, located approximately 20 feet north was sampled for arsenic and high concentrations of arsenic were found. In addition, well MW-101 had the highest total VOC concentrations during the FES.

The higher levels of arsenic found on-site (up to 1300 ppb) suggest a potential influence of the Landfill Leachate (i.e., VOC, organic acids, sulfides, iron, etc.) in the groundwater on the mobility of naturally occurring arsenic. In addition, arsenic may have been disposed of at the

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Landfill due to its presence in typical municipal wastewater sludge and industrial wastes.

The national guidance (RAGS) states that while filtration of groundwater samples provides useful information for understanding chemical transport within an aquifer, the use of filtered samples for estimating exposure may underestimate chemical concentrations in water from an unfiltered tap. Therefore, data from unfiltered samples should be used to estimate exposure concentrations.

The ROD states that a background level for arsenic will be determined by the EPA and the NHDES after the pre-design sampling results have been evaluated. EPA will set the cleanup level for arsenic in groundwater to the RCRA MCL of 50 ug/l or background, whichever is determined to be higher. The cleanup level will be set for total arsenic in groundwater (unfiltered) because this is representative of the residential use of groundwater for a drinking water supply.

Comment d: ESI states that the baseline risk assessment is based on the unrealistic assumption that contaminated off-site groundwater will be consumed and utilized on a daily basis. The reason stated is because at present: 1) private residences that could be impacted by the Site are connected to the municipal water supply; and 2) an ordinance prohibiting the installation or use of a well for any purpose within 1500 feet of the Landfill was added to the City of Dover Code (116-7.1). ESI did, however, calculate risks for the ingestion, inhalation and dermal adsorption of off-site groundwaters.

EPA Response: The NCP states that the role of the baseline risk assessment is to address the current and future risk associated with a site in the absence of any remedial action or control, including institutional controls. EPA addressed the use of institutional controls as a component of remedial action in comment number 3.

Comment e: ESI presented an evaluation of potential pathways considered as part of the RI risk assessment and supplemental risk assessment (FES) and their associated risks, including the exposure to contaminated swale sediments. ESI concluded that contamination present in off-site groundwater represented the only significant potential concern at the Dover Landfill.

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EPA Response: EPA agrees that the primary risk is the ingestion of the off-site contaminated groundwater. Based on the risk assessment performed by HMM for the Supplemental Risk Assessment, and as stated in the ROD, the risks from other exposure pathways are within EPA's risk management goal of 10^{-4} to 10^{-6} . Because EPA did not consider these additional pathways a primary threat, EPA did not critically evaluate ESI's assumptions given that ESI's conclusion was consistent with that of EPA.

Comment f: ESI lists the chemicals regarded as compounds posing the only significant potential concern at this Site. These compounds include: arsenic, benzene, methylene chloride, tetrachloroethylene, trichloroethene and vinyl chloride.

EPA Response: EPA agrees that these compounds present a potential concern at the Site, however, this list is not complete. In addition to the compounds listed by ESI, HMM lists ten chemicals of concern. EPA has determined that these ten compounds are also concern. In particular, tetrahydrofuran, 1,1-dichloroethene and 1,2-dichloroethane pose significant risks.

Comment g: ESI developed "provisional" RfDs values for various chemical compounds, where EPA has not published oral and/or inhalation RfD values in IRIS or HEAST for noncarcinogenic toxicity endpoints.

EPA Response: ESI developed "provisional" RfDs for benzene, tetrachloroethylene, trichloroethylene and vinyl chloride. EPA did not attempt to quantitatively evaluate the noncarcinogenic effects of these compounds because the overriding concern is for the carcinogenic effects. The Hazard Indices for these compounds, as derived by ESI, are 0.44, 0.0062, 0.0099, and 0.29 respectively. EPA determined that those Hazard Indices for noncarcinogenic effects for those particular compounds were insignificant when compared to the Hazard Indices evaluated for arsenic (37) and tetrahydrofuran (24) as presented in the FES Supplemental Risk Assessment.

Comment h: ESI quotes the conclusion of the EPA's Risk Assessment Council review of the Risk Assessment Forum's proposal for quantifying risks associated with oral exposure to arsenic at Superfund Sites. This quote states that the "qualities and uncertainties could, in a specific risk management situation, modify one's concern downward as much

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as an order of magnitude". ESI states that the risk assessment(s) utilized the findings and all the recommendations of the Science Advisory Board's review of the arsenic issues develop provisional slope factors for quantifying increased risks resulting from ingestion of inorganic arsenic.

EPA Response: ESI has factored in the so-called risk management factor into the derivation of the cancer potency factor for daily intakes of 2.86×10^{-3} or less. EPA does not include this risk management factor in calculating the risk assessment, but, rather uses it as a risk management factor in determining cleanup levels for a Site. The use of this risk management factor in estimating risks would result in the risk estimate being decreased by a magnitude of order (ten-fold).

Comment i: ESI states "An MCL of 0.005 mg/l and an MCLG of zero concentration in drinking water has been proposed" for tetrachloroethylene. In addition, ESI lists an MCL for toluene at 2000 ug/l and a Drinking Water Equivalent Level (DWEL) for methylene chloride at 2000 ug/l. These values were presented in Tables comparing chemical concentration levels found at the Site and MCLs or other advisories.

EPA Response: The MCL for tetrachloroethylene at 5 ug/l and the MCLG at zero has been finalized. The MCL for toluene has been finalized at 1000 ug/l. EPA used the proposed MCL (5 ug/l) and MCLG (zero) for methylene chloride to set cleanup levels rather than the DWEL.

Comment j: ESI reports that the combined hazard indices for the three data sets, used in their report, showed consistency and ranged from 0.9 to 1.2. ESI states that a value marginally exceeding unity does not indicate a health hazard.

EPA Response: Although ESI concludes that the noncarcinogenic effects of contaminants are not of concern, EPA's assessment indicated a concern with noncarcinogenic effects of arsenic and tetrahydrofuran; the maximum Hazard Indices being 37 and 24, respectively.

Comment k: ESI developed and presented a "provisional" oral RfD for chloroethane in appendix H of their report (pRfD of 33 mg/kg/day). The Hazard Index for chloroethane was determined by ESI to be 0.00071 for noncarcinogenic effects.

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EPA Response: EPA's Environmental Criteria and Assessment Office recently provided the Regional Office with an interim oral reference dose for Chloroethane of 0.4 mg/kg/day. This oral RfD was derived through extrapolation of the inhalation reference concentration verified by EPA in December 1990. The principle toxicological study for the reference concentration was a developmental inhalation study conducted by Scortichini, et. al., 1986. The noncarcinogenic effects of chloroethane, as presented by EPA in the ROD Decision Summary, is a Hazard Index of 1.0.

IV. REMAINING CONCERNS

Issues raised during the public comment period that will continue to be of concern as the RD/RA phase of site remediation gets underway are listed below. EPA will continue to address these issues as more information becomes available during the RD/RA.

1. Area residents and local officials will wish to be kept informed of the results of site monitoring. Potential contamination of bedrock wells and the Bellamy Reservoir will likely remain a concern.
2. Community members will want assurances that the most cost effective measures are taken through the entire remedial process.

Community interest in the Site may rise due to remedial activity at neighboring Sites such as Somersworth Sanitary Landfill and the Coakley Landfill.

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ATTACHMENT A

**LIST OF FORMAL COMMUNITY RELATIONS ACTIVITIES
CONDUCTED TO DATE AT THE DOVER LANDFILL SUPERFUND SITE**

9 August 1983 Meeting held by EPA and the NHDES at the Dover City Hall to discuss the findings and recommendations of the Remedial Action Master Plan (RAMP).

December 1984 Community Relations Plan issued for the Dover Landfill Site.

13 December 1984 Informational meeting held by NHDES at Dover City Hall to describe plans for the RI/FS.

30 March 1989 Informational meeting held by EPA and NHDES at Dover City Hall to discuss results of the RI.

15 March 1991 EPA Proposed Plan published.

16 March 1991 Administrative Record made available for public review at the EPA office in Boston and at the Dover Public Library.

16 March 1991 EPA press release issued regarding the Proposed Plan, the public meeting and hearing, and the opening of the comment period.

22 March 1991 EPA published a public notice in the Foster's Daily Democrat announcing the availability of the Feasibility Study, Administrative Record; and Proposed Plan; the public comment period; and the scheduled meeting and hearing.

25 March 1991 Informal meeting held by EPA at the Horne Street Elementary School to discuss the results of the RI and FES, and to present cleanup alternatives and EPA's Proposed Plan.

26 March 1991- Public comment period on EPA's Proposed Plan.
24 May 1991

16 April 1991 Informal hearing held by EPA on Proposed Plan.

Responsiveness Summary
Dover Municipal Landfill Site

28 June 1991 EPA Responsiveness Summary issued for Record of Decision on EPA's Preferred Alternative for the Dover Landfill Site.

Responsiveness Summary
Dover Municipal Landfill Site

ATTACHMENT B

**TRANSCRIPT OF THE APRIL 16, 1991
INFORMAL PUBLIC HEARING**

1
2 UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
3 REGION I
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5

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7 Dover Municipal Landfill Superfund Site
8 Dover, New Hampshire
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11
12 DOVER PUBLIC HEARING
13
14

15
16 April 16, 1991

17 7:55 p.m.

18 Moderator: Dan Coughlin,
19 Chief N.H. Superfund
20

21
22 Nancy D. Lowney
23 Certified Court Reporter
24

I-N-D-E-X

	<u>SPEAKERS</u>	<u>PAGE</u>
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1 (Meeting opened 7:55 p.m.)

2 DAN COUGHLIN: My apologies for the
3 inconvenience of making you sit around for a half
4 hour or so. Our stenographer, as I told you,
5 called at the last minute and said they couldn't
6 make it. I appreciate your indulgence.

7 My name is Dan Coughlin. I'm Chief of
8 the New Hampshire Superfund section. We're here
9 tonight to conduct a public hearing for the
10 Remedial Action Proposed Plan Feasibility Study
11 for the remediation of the Dover Municipal
12 Landfill Superfund site.

13 With me tonight up front are Cheryl
14 Sprague, Remedial Project Manager for EPA, and
15 Carl Baxter representing the Department of
16 Environmental Services.

17 Before we start let me just give you a
18 quick format on how we'll conduct the meeting.
19 Cheryl will first give you a very quick discussion
20 on the Proposed Plan itself. We've mailed out
21 numerous copies of those Proposed Plans. If you
22 don't have one and would like one, we have some up
23 over here by Doug, who is from our Human Relations
24 office. And then we will go into the comments.

1 After, we'll hear the comments in the
2 order in which you find them. I think we have
3 about twelve of them. I would reserve the right to
4 ask to limit the comments to about ten minutes.
5 If you think it's going to run more than ten
6 minutes, please summarize your comments and give
7 us a text, full text afterwards, and we'll make
8 sure that text gets in the record.

9 All the comments tonight will be
10 transcribed. Transcriptions will be available,
11 and also be responded to in the Responsiveness
12 Summary, which is part of the Agency's Record of
13 Decision which is our over-all decision document
14 for remediation of the site.

15 The comment period ends May 24th, so if
16 you're going to submit written comments, and we
17 would recommend that you do or encourage you to do
18 so, please make sure they're postmarked by May
19 24th when you send them into us.

20 At the end of the comments I will close
21 the public hearing and we will be available to
22 answer questions up front here if anybody has
23 anything they would like to discuss with me. And
24 then we'll go home.

1 Again, I thank you for your putting up
2 with us in our not having any stenographer. We'll
3 do the best we can.

4 Okay. Any questions on the format?

5 I call on Cheryl.

6 CHERYL SPRAGUE: Thank you.

7 My name is Cheryl Sprague. I'm Remedial
8 Project Manager for the Dover Landfill Superfund
9 site.

10 On March 25th we held a public meeting.
11 at the Horne Street elementary school. Mr.
12 Richard Pease, from the New Hampshire Department
13 of Environmental Services, described the
14 activities during the remedial investigation. At
15 this meeting Mr. Rick Cote, of H.M. and H.
16 Associates, the potential responsible party's
17 contractor, presented the alternatives that were
18 retained for detailed analysis and feasibility
19 study. And I presented the EPA's Preferred
20 Alternative.

21 Tonight I would like to briefly describe
22 the Preferred Alternative, and then we'll open the
23 floor to solicit your comments.

24 The Dover Landfill is situated at the

1 intersection of Glen Hill and Tolend Road in
2 Dover. It is a 55-acre landfill that operated
3 from 1960 to 1979, and accepted both municipal and
4 industrial waste.

5 The Feasibility Study developed
6 alternatives that pertained to either source
7 control or management of migration. Source
8 control for this site refers to the landfill, the
9 perimeter drainage's sediment, the drainage swale
10 sediment and the groundwater and leachate directly
11 under the landfill.

12 The management of migration refers to
13 the contaminated groundwater when it's migrated
14 away from the landfill. We refer to this as the
15 eastern plume and the southern plume.

16 The EPA Preferred Alternative for source
17 control includes recontouring the existing
18 landfill and placing a 55-acre multi-layer cap
19 over the landfill. There will be construction of
20 a groundwater and leachate collection system,
21 which includes the installation of interceptor
22 trench/extraction wells or a combination of the
23 two around the perimeter of the landfill to
24 intercept and collect the leachate.

1 There will be use of an on-site powdered
2 activated carbon treatment system or an equivalent
3 system to treat the groundwater and leachate with
4 discharge to the Cocheco River, or we will have
5 pretreatment with discharge to the Dover Publicly
6 Owned Treatment Works.

7 There will also be limited excavation of
8 the sediments in the drainage swale with
9 deposition back onto the landfill prior to
10 capping.

11 The multi-media cap consists of the
12 following layers. There will be a vegetative
13 topsoil, a common fill layer, a drainage layer, a
14 flexible membrane, low permeability layer. That
15 makes up the multi-media portion. And a gas
16 ventilation layer covering the waste.

17 The preferred alternative on the
18 Management of Migration includes the use of
19 institutional controls, where possible, to
20 prohibit the use of groundwater, site use and site
21 access. There will be an implementation of a
22 long-term groundwater monitoring program. There
23 will also be the implementing of pre-design
24 studies which would include the installation of

1 additional monitoring wells to further define the
2 lateral extent and depth of contamination. We
3 will be conducting one or more pump tests to
4 determine the ability and rate that the
5 contaminated groundwater can be extracted from the
6 aquifer. There will be the attainment of the
7 target cleanup levels in the eastern plume for
8 natural attenuation processes such as adsorption,
9 dispersion and degradation.

10 There will also be the installation of
11 groundwater extraction wells in the southern plume
12 with an on-site treatment system, either a
13 powdered activated carbon treatment system or an
14 equivalent system, with recharge back to the
15 wetlands and or discharge to the Cocheco River.

16 The cost for these preferred
17 alternatives is approximately 26 million dollars.
18 A large portion of these costs is due to the need
19 to import large volumes of fill material needed to
20 construct the 55-acre cap.

21 That concludes the presentation. I will
22 now turn it back to Dan to open for any comments.

23 DAN COUGHLIN: Okay. Thank you, Cheryl.

24 The first comments, John Peltonen,

1 attorney representing the city of Dover.

2 JOHN PELTONEN: Good evening, ladies and
3 gentlemen. For the record, my name is John
4 Peltonen and I'm an attorney and I'm legal counsel
5 to the city of Dover in this matter.

6 And I want to thank you for this
7 opportunity to speak on behalf of the City, and
8 remind you that in the order of sign-up this
9 evening my remarks will be followed by his Honor,
10 George Maglaras', mayor of the city of Dover, and
11 his remarks in turn will be followed by those of
12 Mr. David Wright, who is the city manager.

13 First and foremost, the City recognizes
14 that it has two principal obligations in this
15 matter. One is to protect the public health and
16 the environment. And in that regard the City has
17 undertaken several tasks to assure that public
18 health is assured and is safe.

19 The second obligation and of equal
20 importance is to protect the public fisc, that is,
21 the public treasury. And the City has a great
22 concern with the expenditure of tens of millions
23 of dollars in view of the minimal if any risk
24 which confronts us, especially since we feel that

1 risk otherwise can be controlled.

2 We would urge on behalf of the City that
3 the Agency consider instituting a limited action
4 proposal alternative along the lines perhaps of
5 SC-2, holding in abeyance implementation of any
6 other remedy, because this would provide overtime
7 protection to human health since there will be no
8 exposure pathways for ingestion of groundwater,
9 ingestion of soils, or inhalation of airborne
10 contaminants.

11 This site was covered with a vegetative
12 cover in 1979, pursuant to then existing
13 regulations. Institutional controls in effect and
14 which can be put into effect can prevent the
15 disturbance of that cover and prevent access to it
16 to prevent ingestion or inhalation.

17 The City already has provided public
18 water and has enacted a restrictive use ordinance
19 to prevent the use of the ground water in that
20 area.

21 In fact, from the moment that site was
22 permitted by the State as a dump site, as a
23 landfill, the use of that aquifer for drinking
24 purposes was doomed from that point on in the

1 early '60s.

2 Institutional controls can be instituted
3 at the Bellamy to keep the water dammed and
4 mounded, reversing further flow in that direction
5 and creating the equivalent of a hydraulic control
6 in that area.

7 And the compliance boundary can and
8 should be extended out to at least the five
9 hundred foot level beyond the waste pile,
10 consistent with New Hampshire water supply
11 regulations, WS, part 410.

12 Evidence already suggests that the plume
13 is retracting, probably as a result of the cover
14 materials already over the site and the drainage
15 ditch that was installed around the site in the
16 mid 1980s. Nothing more has been done on the site
17 with regard to remediation since that time, and it
18 appears conditions are improving.

19 Before we spend 26 million dollars we
20 must give a limited alternative a chance, so that
21 we can monitor that plume. We are of the opinion
22 that it presents no realistic threat to health
23 since the actions already taken, combined with a
24 limited action alternative, will eliminate

1 exposure pathways. In fact, we would urge you to
2 consider that construction of the remedy with its
3 necessary disturbance of the site will create much
4 greater risk to residents and to the workers than
5 would compliance with a limited action
6 alternative. And this factor must be weighed in
7 the analysis.

8 Now, we understand the Agency's need to
9 avoid the time and expense of performing another
10 RIFS and a ROD five years from now. And what we
11 recommend is to include SC-7A with modifications,
12 which I will discuss, but defer its
13 implementation, because we believe that limited
14 action with institutional controls over time will
15 prove to be all we need to protect human health
16 and the environment.

17 With regard to the proposed plan which
18 we urge you to hold in abeyance, clearly the
19 Management of Migration component is not
20 necessary, at least not now. The plume to the
21 Bellamy appears to be retracting. Contaminants
22 from the landfill probably will not reach the
23 Bellamy reservoir and we should permit a time to
24 continue monitoring that area. We believe we will

1 be proven right, and at least implementation
2 should be deferred to permit that monitoring.

3 Consideration should be given to
4 deleting any requirement to install an up-gradient
5 interceptor trench, or at least to separate its
6 flow from that in the down-gradient trench,
7 thereby reducing the volume of water to be treated
8 and decreasing the capital costs in the time of
9 treatment associated with a water treatment
10 facility. And the compliance boundary should be
11 set away from the edge of the waste pile to permit
12 a more realistic ability to reach desired goals.

13 We are concerned that the extent of the
14 effort proposed is an unnecessary and
15 extraordinary expenditure of scarce assets when a
16 limited action alternative can provide adequate
17 protection over time. Cost and community
18 acceptance are two of your criteria. Just as you
19 eliminated an 800 million dollar remedy, we
20 believe you can eliminate a 26 million dollar
21 remedy and still protect the public.

22 Please listen to the comments that you
23 will hear tonight, and please be flexible in the
24 development of the ROD to permit limited action